UNIVERSITE CHEIKH ANTA DIOP DE DAKAR
❐❐◆❐❐
OFFICE DU BACCALAUREAT
Email: office@ucad.edu.sn
Site web: officedubac.sn

2025GS32NA0138
Durée : 02 heures
Série : S3 – Coef. 02

Épreuve du 1er groupe

A N G L A I S

Solar-Powered Device Generates Sustainable Fuel

Researchers from the university of Cambridge have developed a reactor that pulls carbon dioxide directly from the air and converts it into sustainable fuel, using sunlight as the power source. The researchers say their solar-powered reactor could be used to make fuel to power cars and planes, or the many chemicals and pharmaceuticals products we rely on. It could also be used to generate fuel in remote or hard-access locations. Unlike most carbon capture technologies, the reactor developed by the Cambridge scientists does not require fossil-fuel-based power, or the transport and storage of carbon dioxide, but instead converts atmospheric CO_2 into something useful, using sunlight.

Carbon Capture and Storage (CCS) has been publicized as a possible solution to the climate crisis, and has recently received £22 billion in funding from the UK government. However, CCS is energy-intensive and there are concerns about the long-term safety of storing pressurised CO_2 deep underground, although safety studies are currently being carried out. “Aside from the expense and the energy intensity, CCS provides an excuse to carry on burning fossil fuels, which is what caused the climate crisis in the first place,” said Professor Erwin Reisner, who led the research. “CCS is also a non-circular process, since the pressurised CO_2 is, at best, stored underground indefinitely, where it’s of no use to anyone.” First author Dr. Sayan Kar from Cambridge’s Yusuf Hamied Department of Chemistry added: “What if, instead of pumping the carbon dioxide underground, we made something useful from it? CO_2 is a harmful greenhouse gas, but it can also be turned into useful chemicals without contributing to global warming.”

The focus of Reisner’s research group is the development of devices that convert waste, water, and air into practical fuels and chemicals. These devices take their inspiration from photosynthesis, the process by which plants convert sunlight into food. The devices don’t use any outside power: no cables, no batteries—all they need is the power of the sun. The team’s newest system takes CO_2 directly from the air and converts it into syngas, a key intermediate in the production of many chemicals and pharmaceuticals. The researchers say their approach, which does not require any transportation or storage, is much easier to scale up than earlier solar-powered devices.

Adapted from https://www.cam.ac.uk/research/news/solar-powered-device-captures-carbon-dioxide-from-air-to-make-sustainable-fuel

I. TEXT COMPREHENSION *(10 marks)*

A) Read Paragraph1 and tick (✓) the correct category to classify characteristics 1-2-3-4. *(02 marks)*

	Categories		
Characteristics of the Reactor	**Reality**	**Possibility**	**Unreality**
0. It pulls carbon dioxide directly from the air.	✓		
1. It is powered by sunlight.			
2. It produces fuel for cars and planes.			
3. It helps generate fuel in remote locations			
4. It converts atmospheric CO_2.			

.../…2

B) Read Paragraph 2 and list 6 (six) problems related to the storage of pressurised CO_2. *(03 marks)*

5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

C) Read Paragraph 3 and match the items in Box X (11-14) to the items in Box Y (a-e). *(02 marks)*

X

11. Development of devices that convert waste into fuel
12. These devices take their inspiration from photosynthesis
13. All these devices need is the power of the sun
14. The system takes CO2 from the air, converts it into syngas

Y

a) How the Devices Work
b) Inventors' Major Activity
c) Very Inspirational Tech
d) Unlimited Energy Autonomy
e) Tech Imitating Nature

Answer Box			
11.	12.	13.	14.

D) Find English EQUIVALENTS of the following French phrases in the paragraphs indicated. *(03 marks)*

15. « zones enclavées »: ☞ _____ (Paragraph 1)
16. « il est inutilisable »: ☞ _____ (Paragraph 2)
17. « ne nécessite ni transfert ni entreposage »: ☞ _____ (Paragraph 3)

II. LINGUISTIC and COMMUNICATIVE COMPETENCE *(06 marks)*

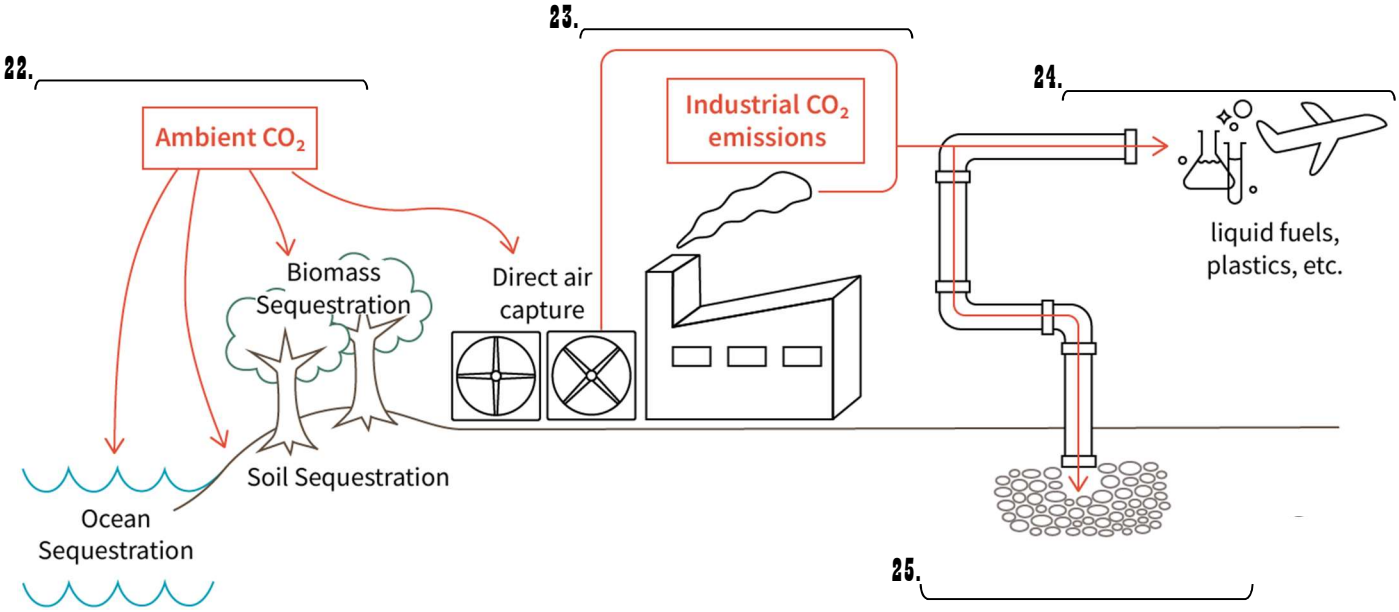
E) Fill in the blanks in the passage below with correct forms of the words in parentheses. *(02 marks)*

Carbon capture and storage (CCS) is a way of reducing carbon dioxide (CO_2) emissions, which is very important in helping tackle global warming. CO_2 emissions usually (18) _____ (*origin*) from industrial activity such as steel and cement production, or from the burning of fossil fuels in power generation. CCS is a three-step process that involves (19) _____ (*captures*) the carbon dioxide, transporting it via ship or pipeline to clearly identified areas, and then permanently storing it deep underground. The International Panel on Climate Change (IPCC) (20) _____ (*proclamation*) that if we want to accomplish the ambitions of the Paris Agreement and limit future temperatures increases to 1.5°, we must do more than just making (21) _____ (*collectiveness*) efforts to reduce emissions – we also need to deploy technologies to remove CO_2 from the atmosphere. CCS is one of these technologies.

Adapted from https://www.nationalgrid.com/stories/energy-explained/what-is-ccs-how-does-it-work

F) Read the description and use the phrases in the box to fill in the legend (22-25). *(02 marks)*

Storage ❀ Transport ❀ Carbon Capture ❀ Carbon Dioxide Removal ❀ Utilization



Storage: In geologic storage, CO_2 is injected into deep underground geological formations for permanent/durable storage. Other forms of storage or include deep ocean biomass sinking, enhanced mineralization, reforestation, and soil-based sequestration.
Transport: This is about moving compressed CO_2 by ship or pipeline from the point of capture to the point of use or storage location for long-term isolation from the atmosphere.
Carbon capture: Technology is used to capture CO_2 before it is emitted into the atmosphere from fossil fuel or biomass power plants or industrial facilities like cement and steel plants.
Carbon dioxide removal (CDR): CDR refers to methods that remove CO_2 already in the atmosphere**.** Oceans, forests, soils, and wetlands naturally remove CO_2 from the air through physical and biological processes like photosynthesis.
Utilization: CO_2 is converted into useful products. Captured CO2 is used as an input or feedstock to create various types of products (such as fuel) or services.

Adapted from https://understand-energy.stanford.edu/tools/carbon-management

G) Reorder the following sets of phrases to make meaningful sentences, as in the example. *(02 marks)*

Example: odorless gas that / role in the climate. / Carbon dioxide (CO_2) / plays a vital / is a colorless,
☞ *Carbon dioxide (CO_2) is a colorless, odorless gas that plays a vital role in the climate.*

26. plants and is a / It is essential for / gas. / significant greenhouse / photosynthesis in

☞ _____

27. its concentration. / While it is naturally / drastically increased / present in the atmosphere, / human activities have

☞ _____

_____

III. WRITING *(04 marks)*

Choose ONE topic and write between 100 and 150 words about it.

Topic 1: All developed countries have built their economies on the extensive consumption of fossil-fuel-based energy. Now, they are using scientific arguments to discourage African leaders from exploiting their oil and gas deposits, officially to fight against global warming. Do you think our government should listen to these arguments? Why or why not?

Topic 2: French president Emmanuel Macron was quoted saying: “By polluting the oceans, by not mitigating CO2 emissions, and by destroying our biodiversity, we are killing our planet. Let’s face it, there is no planet B.” Write down your reaction to this statement.